THE GENERIC POSITION OF *AMPHIGERONTIA FORMOSA* BANKS (PSOCOPTERA: PSOCIDAE) AND RELATED SPECIES

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Abstract

Amphigerontia formosa Banks is redescribed and transferred to *Sigmatoneura* Enderlein. *Scaphopsocus* Smithers and *Sigmatoneura* are synonymized by transfer of *Scaphopsocus phaeotherus* Smithers to *Sigmatoneura. Psocus filicornis* Enderlein is considered to be the male of *Cerastipsocus subcostalis* Enderlein and *Scaphopsocus smithersi* New to be the male of *Scaphopsocus albostriatus* New; both are considered, with *Amphigerontia kolbei* Enderlein, to belong to *Sigmatoneura.*

Introduction

Amphigerontia formosa Banks (Banks, 1918) was described from a single female taken at Kuranda, Queensland. Additional material is now available, including males. As Banks' description was brief, of one sex only and as no description was given of genitalia, a redescription of the species is given here. New data necessitate discussion of the generic position of the species and that of related species from Africa and Asia.

Redescription of *Amphigerontia formosa* Banks

This is one of Australia's largest species of Psocoptera.

FEMALE

Coloration (in alcohol). Head pale brown with brown markings. An indistinctly defined median brown band from clypeo-labral suture to top of vertex; postclypeus with series of almost parallel brown stripes; brown mark between compound eye and back of head; a few irregular brownish marks on epicranial plates; gena with brown mark on anterior half. Labrum and anteclypeus dark in middle, paler laterally. Scape, pedicel and first flagellar segment pale brown; remainder of flagellum black. Eyes black. Ocelli margined black adjacent to each other. Maxillary palps pale, apical segment black. Mesonotum very dark brown, shiny; sutures, postero-lateral margin of lateral lobes and scutellum pale. Legs pale brown, tips of tibiae and tarsi dark. Fore wings (Fig. 1) hyaline with brown markings. Veins dark brown to whitish (see Fig. 1). Hind wing (Fig. 2) hyaline with faint brown tinge behind M and before R_1

Morphology. Length of body: 5.0 mm. Median epicranial suture distinct. anterior arms indistinct. Length of flagellar segments: f_1: 1.7 mm; f_2: 1.6 mm. Antennae nearly twice as long as fore wings. Antennae long, fine, with short setae. Eyes small, almost reaching level of vertex. IO/D (Badonnel): 2.3; PO: 0.73. Ocelli small, of equal size. Measurements of hind leg: F: 1.3 mm.; T: 2.3 mm; t_1: 0.5 mm; t_2: 0.25 mm; rt: 2:1; ct: 18, 3. Fore wing length: 6.0 mm; fore wing width: 2.1 mm. Fore wing (Fig. 1) somewhat narrowed towards apex. Pterostigma with fairly sharp hind angle. Rs and M joined by fairly long crossvein. R_{4+5} curving back after separation from R_{2+3} so as to approach M closely; R_{4+5} curves forward again before reaching wing margin. Angle between M_1 and M_2 very acute. Areola postica tall with narrow apex. Sc short, approaching costa distally. Fore wing glabrous. Hind wing length: 4.0 mm; hind wing

width: 1.3 mm. Hind wings (Fig. 2) with Rs and M fused for a length, glabrou Epiproct (Fig. 3). Paraproct (Fig. 4). Subgenital plate (Fig. 5). Gonapophys (Fig. 6).

MALE

Coloration (in alcohol). Head as in female but overall a little dark Flagellum entirely black. Tibiae a little darker than femora. Fore wings (Fig. hyaline, a little brown colour at base, otherwise lacking the bold extens pattern of the female; pterostigma dark brown. Veins, including Cu_2, mos dark brown. Terminal abdominal structures very dark brown. Hind wing (Fig. 8

Morphology. Length of body: 4.0 mm. Median epicranial suture v distinct, anterior arms hardly discernible. Lengths of antennal segments: f_1: 1. mm; f_2: 1.5 mm. Antennae long and fine, densely setose; setae erect. Ey larger than in female but not quite reaching level of vertex. IO/D (Badonn 2.1; PO: 0.80. Ocelli large, anterior a little smaller than lateral ocelli. Measu ments of hind leg: F: 1.1 mm; T: 2.0 mm; t_1: 0.45 mm; t_2: 0.25 mm; rt: 1. 1; ct: 17, 4. Fore wing length: 4.6 mm; fore wing width: 1.7 mm. Fore w (Fig. 7). Hind wing (Fig. 8). Epiproct (Fig. 9). Paraproct (Fig. 10). Hypandri (Fig. 11). Phallosome (Fig. 12).

MATERIAL EXAMINED

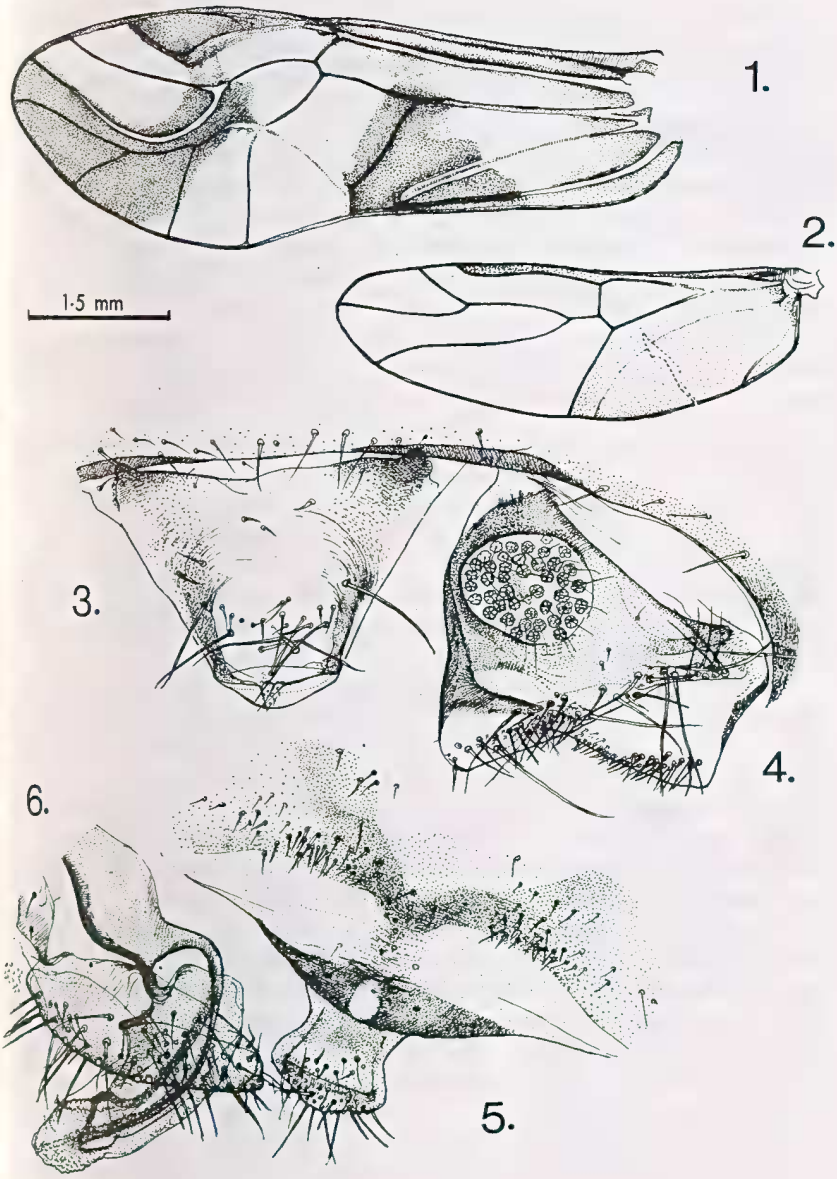
QUEENSLAND: 1♀ (holotype), Kuranda, (Perkins) (M.C.Z. 10,042); 2 8♀, Kipper Creek, Esk, 20.xii.1970 (D. K. Norris) (ANIC). 1♀, 3.2 km Paluma, 13.i.1970 (G.A. Holloway); 1♂, Smithfield, 15.xii.1974 (C.N. Smith J. V. Peters); 1♀, Iron Range, 12.v.1975 (M. S. Moulds); 1♀, Middle Claudie Iron Range, 4.x.1974 (M. S. Moulds); 1♂, Veresdale, 1.vi.1961 (C. N. and A. Smithers) (AM). NEW SOUTH WALES: 1♂, National Park, 29.i.1961 (C. N. A. S. Smithers); 1♂, Bega, 22.iii.1962 (A. S. Smithers); 1♂, Coote's Cross Orara R., 26.viii.1961 (C. N. and A. S. Smithers); 1♀, Coila Creek, S. Mor 13.v.1975 (C. N. and G. F. Smithers); 1♂, 7♀, Muogamarra Nature Rese 23.v.1974 (C.N. Smithers); 1♂, same locality, 2.v.1974 (C.N. and A.S. Smithe 2♀, same locality, 15.xi.1973 (C. N. and A. S. Smithers); 1♂, same loca 18.iv.1974 (C. N. Smithers); 1♂, same locality, 18.vii.1974 (C. N. and A. Smithers); 1 nymph, same locality, 20.vi.1974 (C.N. and A.S. Smithers) (AM

The holotype, which is a female preserved dry, was originally depos in the Museum of Comparative Zoology, Harvard University but is now in t Australian National Insect Collection, Canberra. The other material listed ab is in the Australian Museum (AM) and the Australian National Insect Colle (ANIC).

Discussion

1. *Amphigerontia formosa* Banks and *Scaphopsocus phaeotherus* Smithers.

The discovery of a male of *Amphigerontia formosa* confirms the opi of Enderlein (1924) that the species had been incorrectly assigned to *Amphi ontia* Kolbe; the males of Amphigerontiinae have the eighth sternite stro sclerotized and forming, with the ninth sternite (hypandrium), a strongly b



FIGS 1-6. *Sigmatoneura formosa* (Banks) ♀. (1) fore wing; (2) hind wing; (3) epiproct; (4) paraproct; (5) subgenital plate; (6) gonapophyses.

structure above which lies the phallosome. The phallosome is modified, by reduction, to parameres which are often proximally separated. *A. formosa* was probably placed in that genus because of the presence of a Rs-M crossvein in the fore wing. It is now well known that, in Psocoptera, definition of genera using this character alone can be unreliable. Enderlein (1924) placed *A. formosa* in *Loensia* Enderlein but such action is not justified on venational nor genitalic evidence; Thornton (1961) has already indicated that *A. formosa* cannot be included in *Loensia.* Smithers (1960) erected *Scaphopsocus,* including only *Scaphopsocus phaeotherus* Smithers, on a single male from Tanzania (then Tanganyika). Comparison of males of *A. formosa* and *S. phaeotherus* shows clearly that they are closely related and certainly congeneric. The considerable sexual dimorphism in *A. formosa,* as revealed by the new material and already noted by Takahashi (1921) for *Amphigerontia kolbei* Enderlein (see below) suggests that the female of *S. phaeotherus* has a patterned wing.

2. Other species related to *Amphigerontia formosa* and *Scaphopsocus phaeotherus*

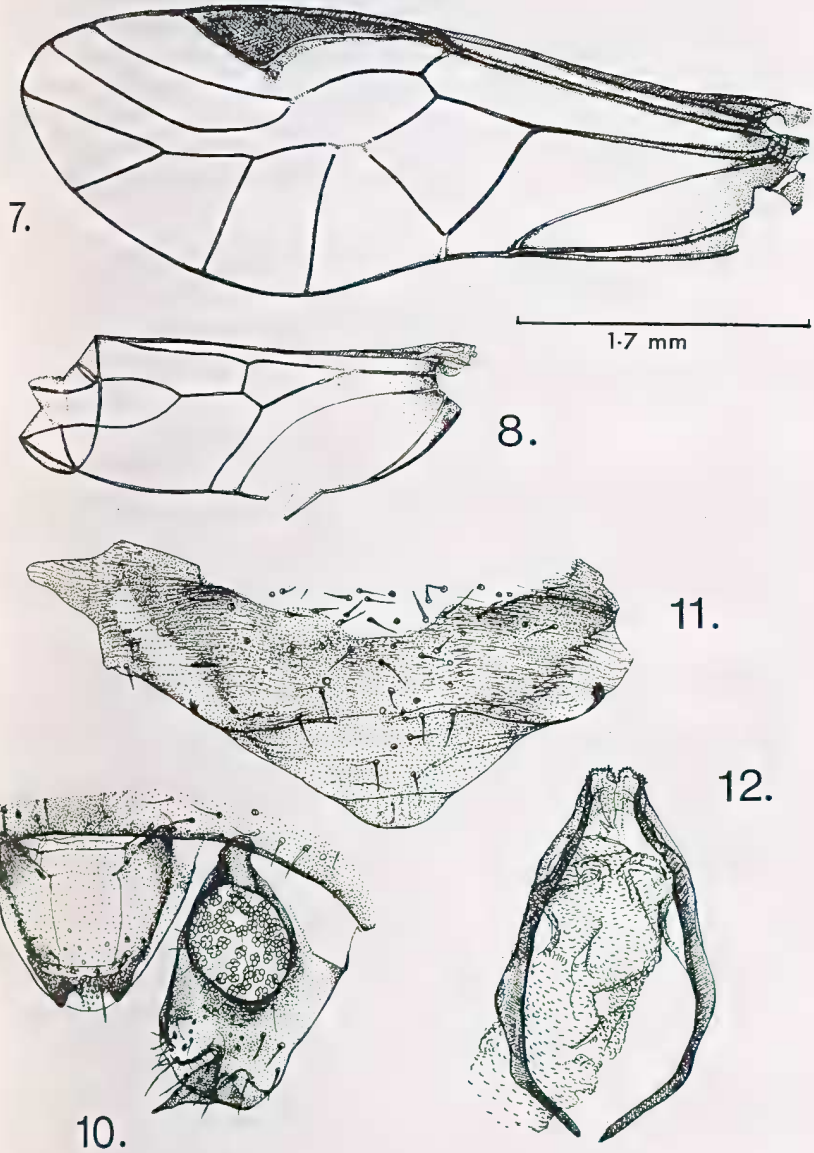
Enderlein (1906) described *Amphigerontia kolbei* from Japan (male only) and Okamoto (1907) described *Cerastipsocus singularis* (male only) and *C. hakodatensis* (female only), also from Japan. Enderlein (1908) regarded Okamoto's species as being the two sexes of one species, *singularis,* and placed it with *Cerastipsocus subcostalis* Enderlein (Enderlein 1903) from Singapore in *Sigmateneura* (Enderlein 1908).

Okamoto (1932) recorded a species which he referred to as *Psocus kolbei* (Enderlein) from Japan as did Tsutsumi (1964). Tsutsumi (1965) transferred *Psocus kolbei* (Enderlein) to *Scaphopsocus* and listed *Sigmatoneura singularis* (Okamoto) as a synonym, at the same time providing figures of the male and female genitalia. Roesler (1944) had, in his key to genera of the Psocoptera, placed *Sigmatoneura* as a subgenus of *Cerastipsocus* Kolbe using venational features; thus, at the time of Tsutsumi's paper (1965) the genus *Scaphopsocus* was regarded as containing two species *phaeotherus* and *kolbei.*

New (1973) described *Scaphopsocus albostriatus* (female only) and *S. smithersi* (male only) from Ife-Ife, Nigeria. Taking into consideration the fact that the specimens came from the same locality and that we now know of the extreme sexual dimorphism in wing pattern, it seems extremely likely that only one species, *albostriatus,* is represented. New (1975) described *Scaphopsocus orientalis* (male only) from Singapore.

Enderlein (1903) described *Cerastipsocus subcostalis*, which he subsequently made the type species of *Sigmatoneura* Enderlein. At the same time (loc. cit., p. 218) when describing *Psocus filicornis* he pointed out the remarkable fact that 12 females of *C. subcostalis* were taken with 6 males of *Ps. filicornis.* Perusal of the descriptions of these two species and the collection data suggests very strongly that *Ps. filicornis* is the male of *C. subcostalis.*

Sigmatoneura subcostalis (Enderlein) and *S. singularis* (Okamoto) [=*Scaphopsocus kolbei* (Enderlein)] are clearly congeneric.



FIGS 7-12. *Sigmatoneura formosa* (Banks) ♂. (7) fore wing; (8) hind wing; (9) epiproct; (10) paraproct; (11) hypandrium; (12) phallosome.

3. Establishment of valid generic name

From the foregoing it becomes clear that there have been described the following congeneric species: *albostriatus* New, *formosa* Banks, *kolbei* Enderlein, *phaeothorus* Smithers, *orientalis* New and *subcostalis* Enderlein. It remains now to establish the valid generic name for this group of species. They cannot be included in *Amphigerontia* Kolbe, *Psocus* Latreille nor *Cerastipsocus* Kolbe on morphological grounds. The earliest generic name available for any member of the group, other than the above three, is *Sigmatoneura* Enderlein; this name should therefore be used.

Synonymic list of species of *Sigmatoneura* Enderlein

Sigmatoneura Enderlein, 1908. *Zool. Anz.* 33: 761.
Type species: *Cerastipsocus subcostalis* Enderlein 1903.

Scaphopsocus Smithers, 1960. *Ann. Mus. Congo belge* 88: 373.
Type species: *S. phaeotherus* Smithers **syn. nov.**

Sigmatoneura subcostalis (Enderlein)

Cerastipsocus subcostalis Enderlein 1903. *Ann. hist.-nat. Mus. hung.* 1: 215, pl. IV, fig.
Sigmatoneura subcostalis (Enderlein). Enderlein 1908. *Zool. Anz.* 33: 761.
Cerastipsocus (*Sigmatoneura*) *subcostalis* (Enderlein). Roesler 1944. *Stettin. ent. Ztg.* 10
147.
Psocus filicornis Enderlein 1903. *Ann. hist.-nat. Mus. hung.* 1: 217 **syn. nov.**
Psocidus filicornis (Enderlein). Smithers 1967. *Aust. Zool.* 15(1): 108 **syn. nov.**

Sigmatoneura kolbei (Enderlein) **comb. nov.**

Amphigerontia kolbei Enderlein 1906. *Zool. Jb. Abt. Syst.* 23: 246.
Cerastipsocus singularis Okamoto 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 118, fig.
Sigmatoneura singularis (Okamoto). Enderlein 1908. *Zool. Anz.* 33: 761.
Cerastipsocus hakodatensis Okamoto 1907. *Trans. Sapporo. nat. Hist. Soc.* 2: 119.
Cerastipsocus hakodatensis Okamoto. Enderlein 1908. *Zool. Anz.* 33: 761.
Psocus kolbei (Enderlein). Okamoto 1932. *Iconographia Insectorum Japonicorum* Ed.
p. 1993.
Scaphopsocus kolbei (Enderlein). Tsutsumi 1965. *Spec. Bull. Lep. Soc. Jap.* 1:
Scaphopsocus kolbei (Enderlein). New 1975. *Oriental Insects* 9(3): 250, figs 21-23.

Sigmatoneura formosa (Banks) **comb. nov.**

Amphigerontia formosa Banks 1918. *Bull. Mus. Comp. Zool. Harv.* 62: 4, pl. II, fig.
Loensia formosa (Banks). Enderlein 1924. *S. B. Ges. naturf. Fr. Berl.* 31: 35.

Sigmatoneura albostriata (New) **comb. nov.**

Scaphopsocus albostriatus New 1973. *Occ. Publ. ent. Soc. Nigeria* 10: 8, figs 16
Scaphopsocus smithersi New 1973. *Occ. Publ. ent. Soc. Nigeria* 10: 9, figs 22-25 (syn. nov.

Sigmatoneura phaeothera (Smithers) **comb. nov.**

Scaphopsocus phaeotherus Smithers 1960. *Ann. Mus. Congo belge* 88: 373.

Sigmatoneura orientalis (New) **comb. nov.**

Scaphopsocus orientalis New 1975. *Oriental Insects* 9(3): 250, figs 18-20.

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INTERESTING BUTTERFLY RECORDS FROM SOUTHERN QUEENSLAND AND CENTRAL NEW SOUTH WALES

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Abstract

A new locality and a previously unrecorded food plant are recorded for *Pseudalmenus chlorinda* (Blanchard); interesting collections of *Toxidia thyrrhus* Mabille and *Argynnis hyperbius inconstans* Butler are reported.